COMPLETE LISTING OF CLAIMS

IN ASCENDING ORDER WITH STATUS INDICATOR

1. (Previously Amended) A method for forming conductors with high electromigration resistance comprising

forming a layer of dielectric on a substrate,

forming at least one trench in said layer of dielectric,

forming a metal liner in said trench,

forming a conductor on said metal liner filling said trench,

forming a planarized upper surface of said conductor planar with the upper surface of said layer of dielectric, and

forming a conductive film over said upper surface of said conductor, said conductive film forming a metal to metal metallurgical bond

and wherein said conductive film has a thickness of 1 to 20 nanometers.

2. (Original) The method of claim 1 wherein said step of forming a conductive film includes the step of forming said conductive film by electroless deposition whereby said upper surface of said conductor is protected from oxidation and corrosion and provides high electromigration resistance and high resistance to thermal stress voiding.

3. (Previously Amended) The method of claim 1 wherein said conductive film has a thickness in the range of 1 to 10 nanometers.

4. (Original) The method of claim 2 wherein said electroless deposited film has a thickness in the range of 1 to 10 nanometers.

5. (Previously Amended) The method of claim 2 wherein said electroless deposition includes first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on said upper surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby said conductive film formed comprises a metal-phosphide conductive film on said upper surface of said conductor, and

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film.

6. Previously cancelled.

7. (Previously Amended) The method of claim 5 wherein said conductive film is selected from the group consisting of CoWP, CoSnP, and CoP.

8. (Previously Amended) The method of claim 2 wherein said electroless deposition includes first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on the surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and dimethylamino borane whereby said conductive film formed comprises a layer of metal-boron conductive film on said upper surface of said conductor and,

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal boron conductive film.

9. (Original) The method of claim 1 wherein said conductive film is applied on the surface of said conductor by physical methods such as Chemical Vapor Deposition (CVD), Physical Vapor Deposition (PVD), evaporation, sputtering and thermal metal interdiffusion.

10. (Original) The method of claim 9 wherein said conductive film is selected from the group consisting of Pd, In, W and mixtures thereof.

11. Previously cancelled.

12. Previously cancelled.

13. Previously cancelled.

14. Previously cancelled.

15. Previously cancelled.

16. Previously cancelled.

17. Previously cancelled.

18. (Previously Amended) A method for forming conductors with high electromigration resistance comprising:

forming a patterned conductor on a substrate,

forming a conductive film over said surface of said conductor, said conductive film forming a metal to metal metallurgical bond and has a thickness of 1 to 20 nanometers.

19. (Original) The method of claim 18 wherein said step of forming a conductive film includes the step of forming said conductive film by electroless deposition whereby said surface of said conductor is protected from oxidation and corrosion and provides high electromigration resistance and high resistance to thermal stress voiding.

20. (Previously Amended) The method of claim 18 wherein said conductive film has a thickness in the range of 1 to 10 nanometers.

21. (Original) The method of claim 19 wherein said electroless deposited film has a thickness in the range of 1 to 10 nanometers.

22. (Previously Amended) The method of claim 19 wherein electroless deposition includes of first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on said surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby said conductive film formed comprises a metal-phosphide conductive film [is formed] on said surface of said conductor, and

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film

23. Previously cancelled.

24. (Previously Amended) The method of claim 22 wherein said conductive film is selected from the group consisting of CoWP, CoSnP, and CoP.

25. (Previously Amended) The method of claim 19 wherein said electroless deposition includes first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on the surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and dimethylamino borane whereby said conductive film formed comprises a layer of metal-boron conductive film on said surface on said conductor, and

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal boron conductive film.

26. (Original) The method of claim 18 wherein said conductive film is applied on the surface f said conductor by physical methods such as Chemical Vapor Deposition (CVD),

Physical Vapor Deposition (PVD), evaporation, sputtering and thermal metal interdiffusion.

27. (Original) The method of claim 26 wherein said conductive film is selected from the group consisting of Pd, In, W and mixtures thereof.

28. Previously cancelled.

29. Previously cancelled.

30. Previously cancelled.

31. Previously cancelled.

32. Previously cancelled.

33. Previously cancelled.

34. Previously cancelled.

35. (Original) The method of claim 8 wherein said conductive film is selected from the group consisting of CoB, CoSnB, CoWB and NiB.

36. (Original) The method of claim 25 wherein said conductive film is selected from the group consisting of CoB, CoSnB, CoWB and Nib.

37. (Currently Amended) The method of claim 2 wherein said electroless deposition <u>for forming said conductive film</u> comprises immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby a metal-phosphide conductive film is formed on said upper surface of said conductor, and

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film.

38. (Currently Amended) The method of claim 19 wherein said electroless deposition for forming said conductive film comprises immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby a metal-phosphide conductive film is formed on said surface of said conductor, and

annealing said substrate in one of an inert or reducing atmosphere at a temperature of at least 300°C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film.